# SSOW – Use of ARC or MIG welders.

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**Scope of Activity:** This safe system of work covers the safe use of ARC or MIG welders.

**Applicable Risk Assessment:** RA 006 – Use of ARC or MIG welders.

**Hazards Expected:** As identified in the applicable risk assessment.

**Mandatory PPE:**
Flame retardant overalls
Safety boots
Heavy duty heat retardant gauntlet gloves
Leather heat retardant apron
Full face welding helmet (EN 175) with welding visor (EN 379)
Ear defenders
Respiratory protective equipment as specified below in body of SSOW

**Additional PPE (as required):**
Heat retardant hat (where there is risk of sparks/ molten metal falling from above)
Bump cap (if working in area/ position with poor head clearance)

**Resources:**
Competent engineer (s)
MIG or ARC welder
Extension cable
RCD
Barrier tape
Welding screens

**Manning:**

Field service engineer(s) reporting to an Engineering Manager who is responsible for providing information, instruction, supervision and ensuring that the engineers are suitably trained. In turn the Engineering Manager reports to the Senior / Regional Business Manager.

Engineers will take full responsibility for:

a) Customer contact, authority to carry out the task, signing and implementing customer work permits and following customer site rules;
b) Establishing with the customer and working in a safe area and environment;
c) Ensuring that a risk assessment is in place, is suitable and sufficiently covers all hazards;
d) Familiarising themselves with the equipment operator and maintenance manuals;
e) Ensuring all maintenance and repairs are completed in accordance with the manufacturer's manual.

**Transport of Inert Gas Cylinder:**

- Ensure vehicle being used is suitable for transporting inert gas cylinder

  - Where possible transport gas cylinders in an open backed vehicle;
  - Vehicles transporting gas cylinder must have suitable ventilation (two low level vents and one roof mounted rotator vent);
  - Vehicles transporting gas cylinder must be equipped with a fire extinguisher (minimum 2KG dry powder);

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- Gas cylinder must never be transported in the cab of the vehicle under any circumstances. The cab must be separate from the rear storage area;
- Ensure all other items in rear storage area of vehicle are appropriately secured to prevent any movement that could impact the gas cylinder and associated equipment;

- Cylinders must be fitted to a trolley, stored upright and trolley suitably secured within the vehicle using ratchet straps to prevent any movement;
- Pressure gauges and regulators must be removed when in transit to prevent damage;
- Check on cylinders after any harsh braking or following an incident;
- Ensure all cylinder valves are closed and remain vigilant for any sign of leaks;
- Ensure service vehicle is maintained in line with manufacturer's recommendations;
- Never carry any items which could cause a source of ignition. Ensure batteries being transported are suitably secured with plastic caps covering posts;
- Always allow equipment to cool before returning them to service vehicle.

**Safe Working Method:**

- Any person using welding equipment must have completed a Forkway approved training course for the relevant type equipment and grade of welding required;
- Upon arrival on site you must sign in where applicable and make contact with the designated site contact. You must ensure you have completed any necessary inductions and any permits to work or other documentation required by customer have been completed;
- Agree with the site contact a designated safe working area in which to carry out all operation
  - Avoid work in areas with high volumes of pedestrian or vehicle movements;
  - Where this cannot be avoided, a cordon should be made around the working area to keep persons and vehicles a safe distance away and protective welding screens erected to stop the UV light being emitted out into the area;
  - Ensure equipment, cables and hoses are in a position where they will not be struck or crushed by pedestrians or vehicles.
  - Check with customer contact to confirm work area is not in a flammable or explosive atmosphere;
  - Check the area with customer contact for any materials which may be flammable or combustible. Remove these before starting or move to an alternative area;
  - Ensure the work area is not wet or damp in anyway. Do not work in rain;
  - Ensure the work area has good levels of ventilation.
  - Welding indoors cannot be undertaken without the aid of a suitably designed Local Exhaust Ventilation system (LEV system);
  - Where welding is undertaken indoors and the weld fume cannot be fully extracted by the LEV system, suitable Respiratory Protective Equipment (RPE) must be used to prevent exposure to any residual weld fume;
  - Where welding is undertaken outdoors, as a minimum, Respiratory Protective Equipment (RPE) of an appropriate grade must be used to prevent exposure to any residual weld fume;

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- Discuss the use of the welding equipment with the customer contact
    - Ensure they inform their employees to stay clear of the work area throughout the task;
    - Ensure they inform their employees and all others in the area that welding will be undertaken and explain that they must not look in the direction of the light emitted from the weld torch;
- Check the object/ component you are going to be welding
    - Ensure it is free from any chemicals/ residues;
    - Ensure it is not coated with lead or chromate paints or is galvanised or cadmium plated;
    - Assess the risk of combustible items or components nearby on equipment under repair catching fire
        - Ideally remove object/ component from equipment under repair;
        - If the object/ component cannot be removed, remove combustible components nearby;
        - If neither is achievable make use of fire retardant blankets and use a second person equipped with a fire extinguisher to fire watch;
    - Assess whether there is a likelihood of the object you are heating or adjoining objects suddenly moving or falling
        - Ensure objects that could suddenly move or fall are suitably supported;
        - Ensure the area is cordoned off and no persons remain below or in the vicinity nearby;
    - Ensure it is not in close proximity to or part of a closed tank, drum or vessel. You must not heat or cut these under any circumstance;
    - Ensure it is not in close proximity to a pneumatic tyre. Remove wheel or deflate tyre if this cannot be avoided;
    - Check to ensure you can avoid contact with or standing on the workpiece/ conductive surfaces.
        - If standing on conductive surface is unavoidable, use a sufficiently sized rubber mat to insulate yourself;
- Transport welding equipment to the work area and position it away from pedestrians or vehicles;
- Unravel electrical cables and hoses and suitably position them
    - Where they will not be crushed by pedestrians or vehicles or cause a trip hazard;
    - Where they will not be struck by flame, sparks or molten metal;
    - Away from sharp edges and abrasive surfaces;
- Complete pre use checks on welding equipment following appropriate pre use check sheet
    - Ensure there are no leaks from any inert gas being used;
    - Ensure CP07 checks have been completed on gas cylinder within the last 12 months;
    - Ensure MIG or ARC welder is within current PAT Test (within last 12 months as a minimum);
    - If defects are found, take equipment out of service and affix a do not use tag. Inform line manager;
- Complete pre-use checks on all PPE and once satisfied fit and adjust;
    - Ensure items are free from defects;
    - Ensure all PPE is clean and free from flammable contaminants or residues;
    - Ensure all items are dry, especially the gloves;
    - Ensure all items are tight fitting;

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- Ensure items are CE or UKCA marked and to the correct standards (CE mark valid for products on the market before 31/12/22 – duel marking accepted);

- Follow manufacturer's instructions to set up welder to the correct settings for the task in hand;
- Complete welding operation in line with training;
- Monitor the area that was heated and immediate vicinity for at least half an hour before leaving site and remain vigilant for signs of smoke or smouldering during this time. Consider using water to douse and cool areas that have been heated;

**Local Exhaust Ventilation (LEV):**

LEV systems come in various shapes, sizes and constructions dependant largely on the fume, gas or vapour they intend to extract and from the type of activity that has generated it.

Typical examples of where you might find LEV systems in our industry include paint spray booths to extract harmful paint dusts/ fumes or in work bays in workshop locations to extract vehicle exhaust emissions. It must be noted however that these types of LEV system are not suitable to protect you against weld fume.

Welding requires its own suitably designed LEV System. There are generally two types of LEV options that we will have to choose between for indoor welding tasks. Firstly there are fixed LEV Systems which are installed in Hot Work areas and are not movable from that area. In the case of this type the equipment or components being welded will need to be taken to the hot work area and the welding activity undertaken in that area.

Where equipment or components being welded cannot be taken to a dedicated hot work area, a portable LEV system will have to be used. These systems work largely in the same manner as fixed units from an operational perspective however they can be moved to the location of the equipment or component and set up around it.

Both units operate in a similar way with the weld fume being extracted through a duct which should be manoeuvred into a position in close proximity to the weld activity. The manufacturer's specific operating instructions for the particular LEV system being used must be followed to ensure maximum effectiveness.

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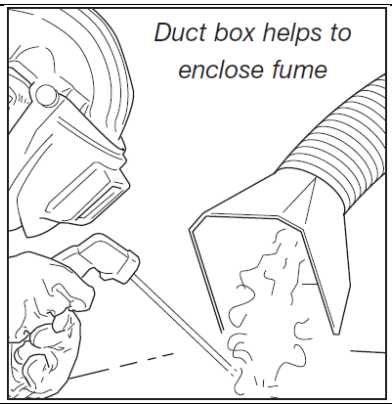
|  |  |  |
| Fixed LEV System | Portable LEV System | LEV Duct In Operation |

Welding activities that are completed outside in fresh air will not typically require an LEV system to be in place. An exception to this would be where weld fume might become trapped in a closed space on the equipment or where there is restricted air movement in which case a portable LEV system may still be required.

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**Respiratory Protective Equipment (RPE):**

Similar to LEV systems, RPE also comes in various shapes, sizes and types, each offering varied grades of protection against different types of dusts, fumes or vapours. The type of RPE you require is therefore very dependent on the activity you're doing and the level of exposure you have to a particular harmful agent.

In the case of weld fume, there are two main categories of RPE that we will need to choose between for the activities we undertake. The determining factor in this decision will be the duration of your exposures and the frequency.

Where you have the assistance of an LEV system it is likely that a disposable respirator will suffice as it is only likely to be residual weld fume however long duration and/ or high frequency users should again consider the use of Powered Air Respirator.

The table below provides guidelines on what type of RPE we would recommend in different scenarios.


FPP3 Disposable Respirator BS (EN140 & EN143)


Powered Air Respirator BS (EN 12941)

Outdoor Welding RPE Guidelines (No LEV in Place)

| | Short Duration (<30 mins) | Medium Duration (30 - 60 mins) | Long Duration (>60 mins) |
|---|---|---|---|
| Low Frequency (Quarterly or less) | Disposable Respirator | Disposable Respirator | Powered Air Respirator |
| Medium Frequency (Monthly or less) | Disposable Respirator | Disposable Respirator | Powered Air Respirator |
| High Frequency (Weekly) | Disposable Respirator | Powered Air Respirator | Powered Air Respirator |

Indoor Welding RPE Guidelines (LEV in Place)

| | Short Duration (<30 mins) | Medium Duration (30 - 60 mins) | Long Duration (>60 mins) |
|---|---|---|---|
| Low Frequency (Quarterly or less) | Disposable Respirator | Disposable Respirator | Disposable Respirator |
| Medium Frequency (Monthly or less) | Disposable Respirator | Disposable Respirator | Disposable Respirator |
| High Frequency (Weekly) | Disposable Respirator | Disposable Respirator | Powered Air Respirator |